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State of California  
The Resources Agency  
Department of Water Resources

**RECREATION NEEDS ANALYSIS**

*FINAL*

**R-17**

**Oroville Facilities Relicensing  
FERC Project No. 2100**



JUNE 2004

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*FINAL*

**Oroville Facilities Relicensing  
FERC Project No. 2100**

**This report was prepared under the direction of**

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This report was prepared under the general direction of DWR staff. Opinions, findings, and conclusions expressed in this report are those of the authors. This report does not express the official position of DWR unless specifically approved by the Director or his designee.

## REPORT SUMMARY

The California Department of Water Resources (DWR) operates the Oroville Facilities, a multipurpose water supply, flood control, power generation, recreation, fish and wildlife enhancement, and salinity control project. The hydroelectric facilities operate under a license from the Federal Energy Regulatory Commission (FERC). The license expires on January 31, 2007. Pursuant to the Federal Power Act, DWR is required to file an application for a new license on or before January 31, 2005. DWR commissioned this study as part of a collaborative relicensing process for the preparation of a license application to be submitted to FERC for the Oroville Facilities (FERC Project No. 2100). Seventy-two background studies have been or are being conducted, 19 of which are related to recreation and recreation-related socioeconomics. This document presents the results of Relicensing Study R-17: *Recreation Needs Analysis*. The report is needed because FERC regulations require that licensees develop a comprehensive recreation plan for their facilities during the relicensing process (Subpart F, Section 4.51 of 18 Code of Federal Regulations [CFR]).

The *Recreation Needs Analysis* contributes to the development of a new recreation plan for the Oroville Facilities area, or Oroville Facilities Recreation Management Plan (RMP). This capstone study synthesizes the major results of the other technical resource recreation studies completed during the relicensing process. It should be noted that the recreation needs noted in this study may or may not be in the Oroville Facilities RMP that will be submitted to the FERC with the final license application. This is because various options for satisfying some of the identified recreation needs may require further exploration as to their best fit, feasibility, and cost effectiveness.

Typical public recreation needs may be related to items such as: providing adequate public health and safety, compliance with the Americans with Disabilities Act (ADA), protecting natural and cultural resources in recreation areas, providing adequate public access to Project lands and shorelines, and providing and maintaining adequate public recreation facilities and use areas. For the purposes of FERC relicensing, a public recreation need is typically related to Project operations, the Project water bodies and is water-related. A public recreation need is also typically within or immediately adjacent to the FERC boundary.

Potential recreation resource actions that are aimed at enhancing economic development in the area or region, or in meeting recreation needs originating outside the Oroville Facilities area, are not considered recreation needs in this study and are not included in the results.

The objective of this study is to develop a comprehensive list of both overall and site-specific public recreation-related needs in the Oroville Facilities study area.

The report identifies and estimates existing and future public recreation facilities and services that are likely to be needed in the study area through the term of the anticipated new license.

Several FERC relicensing studies were reviewed and used to define public recreation needs in the study area:

- € SP-R-1-*Vehicular Access Study*
- € SP-R-2-*Recreation Safety Assessment*
- € SP-R-3-*Assess Relationship of Project Operations and Recreation*
- € SP-R-4-*Relationship assessment of Fish/Wildlife Management and Recreation*
- € SP-R-5-*Recreation Areas Management Assessment*
- € SP-R-6-*ADA Accessibility Assessment*
- € SP-R-7-*Reservoir Boating*
- € SP-R-8-*Recreation Carrying Capacity*
- € SP-R-9-*Existing Recreation Use*
- € SP-R-10-*Recreation Facility and Condition Inventory*
- € SP-R-11-*Recreation and Public Use Impact Assessment*
- € SP-R-12-*Projected Recreation Use*
- € SP-R-13-*Recreation Surveys*
- € SP-R-14-*Assess Regional Recreation and Barriers to Recreation*
- € SP-R-15-*Recreation Sustainability Study*
- € SP-R-16-*Whitewater and River Boating*
- € SP-R-18-*Recreation Activity and Spending/Economic Impacts* (selected data)
- € SP-R-19 – *Fiscal Impacts* (selected data)
- € SP-L-1 – *Land Use* (selected data)
- € SP-L-2 – *Land Management* (selected data)
- € SP-W-3 – *Recreation Facilities and Operations Effect on Water Quality* (selected data)
- € Terrestrial and Cultural Studies (selected data in GIS-based suitability analysis)

Results from this study are intended to synthesize and help address Issue Statements identified by the Recreation and Socioeconomics Work Group (RSWG):

- € Assess the adequacy of existing Project recreation facilities, opportunities, and access to accommodate current use and future demand;
- € Assess the adequacy of public safety at the study area recreational facilities;
- € Assess the effects of facilities operations on recreation and socioeconomic opportunities;

- € Assess the adequacy of operations and maintenance (O&M) and clean-up activities associated with existing and new recreation areas;
- € Identify options for appropriate recreation funding, development, and management structure, and the resulting specific recreation activities; and
- € Identify options for appropriate management of fisheries and wildlife resources to provide recreational opportunities.

The study area for this analysis is divided into six resource areas: Lake Oroville, Thermalito Diversion Pool, Low Flow Channel, Thermalito Forebay, Oroville Wildlife Area (OWA), and Thermalito Afterbay.

To identify public recreation needs in the study area, a two-step process was used:

- € Analyze other relicensing study results and conclusions to identify and synthesize results regarding overall “big picture” public recreation needs in the study area and options to accomplish those needs; and
- € Based on these overall recreation needs, identify conclusions about specific public recreation needs (sometimes with options) on a site-by-site basis based on the overall needs in the study area.

Existing public recreation needs were identified and potential future recreation needs projected over the anticipated term of the new license. Existing needs are defined as priority needs and would be addressed during the current timeframe through 2010. Potential future needs are defined as lower priority needs and are projected out by future decade (2011 to 2020, 2021 to 2030, etc.) based on when the need is anticipated to occur, but subject to the results of a future recreation monitoring program.

Four types of recreation needs have been defined in this study:

- € Capital improvements;
- € Operations and maintenance (O&M);
- € Programmatic; and
- € Other considerations.

A capital improvement need is a one-time expense that may include actions such as renovating, upgrading, or expanding an existing facility, or constructing a new facility. An O&M need includes items that are ongoing or periodic such as trash pick-up, cleaning of restrooms, etc. Other considerations are potential actions that would enhance the public’s recreational experience in the study area, but are considered lesser priority needs. A programmatic need includes monitoring use levels, opportunities for periodic stakeholder input, clarifying recreation management responsibilities, etc.

## **Summary of Overall Recreation Needs by Activity Type**

Several different types of public recreation activities were considered in the analysis including:

- € Camping (at developed and dispersed undeveloped shoreline sites);
- € Day use/picnicking (at developed and dispersed undeveloped shoreline sites);
- € Boating;
- € Swimming and sunbathing;
- € Interpretation and education (I&E) (including programs and signs);
- € Non-motorized trail use (including hiking, walking, mountain biking, and equestrian);
- € Fishing (boat and bank); and
- € General use of open space (including hunting, wildlife observation and photography, birding, and other dispersed activities).

A complete list of the overall recreation-related needs by activity type is summarized in Table 5.2-1 in this report. Recreation needs by site are further defined and summarized in Table 6.1-1 in this report. The latter table is also included in this Report Summary at the end (Table RS-1).

### **Camping**

Regarding camping, estimates of projected (future) use at developed campgrounds in the Lake Oroville resource area indicate that most sites will be at or exceeding their facility capacity prior to the end of the new anticipated license term (assumed to be 2050 for planning purposes). While existing camping capacity appears adequate and facilities are well-maintained, development of new developed campsites is a management option that should be considered to help address the anticipated need for additional camping capacity in the future. By 2050, it is estimated that approximately 75-100 new campsites may be needed (based on future monitoring results) in the Lake Oroville resource area to meet demand for camping based on current projections. Primary areas to consider for camping include the Loafer Creek and Lime Saddle recreation areas. At undeveloped dispersed campsites in the study area, site hardening, increased visitor education, and increased enforcement and management presence should be considered to minimize recreation-related impacts to resources and to enhance visitor safety. Dispersed camping problems are primarily at the OWA.

### **Day Use and Picnicking**

Day use recreation facilities are generally in good condition throughout the study area. However, the eastern portion of Lake Oroville lacks existing day use and picnicking facilities. Developed day use facilities with shoreline access are

desired, though in limited supply at Lake Oroville. Several sites may be improved to enhance day use opportunities in this area. At the Diversion Pool, no day use facilities exist except for a vault toilet building. Additional day use facilities in this area are needed including access from Lakeland Boulevard. The Thermalito Forebay and Afterbay provide day use facilities and are in generally good condition. These facilities provide substitute shoreline day use access when the pool level is low at Lake Oroville; however, they are remote from Lake Oroville. Some facility enhancements are proposed in these areas.

### Boating

Boating facilities are numerous and are generally in good condition at Lake Oroville. These facilities are well distributed throughout the study area, except for the North Fork and the Middle Fork of Lake Oroville where road access is minimal. Boating facilities are generally concentrated in areas close to main access routes and the city of Oroville. Demand for boating is projected to continue to increase over the anticipated term of the new license. Boating activity is also strongly affected by changes in reservoir pool level at Lake Oroville and can vary by water year, affecting access at some boat ramps and car-top boat ramp sites. Multi-level ramps have been constructed to facilitate use at different water-levels, and several boat ramps have recently been extended to provide access at lower pool levels. Management considerations related to future boating improvements and management include providing additional parking and further extending ramp lanes at some Lake Oroville boat ramps, reducing allowed boat speeds at Thermalito Afterbay, and providing improved car-top boat launching at the Diversion Pool.

### Swimming and Sunbathing

Swimming and sunbathing opportunities are provided at Lake Oroville and the Thermalito Forebay and Afterbay. Pool level fluctuations at Lake Oroville make swim areas, in particular Loafer Creek, unusable at certain times of the year or in a low water year. Thermalito Forebay and Afterbay provide swimming opportunities throughout all of the summer months as their pool levels are more stable. Various options exist to enhance swimming opportunities at the Project such as providing new swimming facilities at the Loafer Creek and/or potentially Lime Saddle recreation areas that would not be affected by reservoir drawdown. Additionally, improvements at some car-top boat ramps could be made to enhance swimming opportunities at these sites. Another consideration is to assess the feasibility of providing warmer water swimming at the North Thermalito Forebay. Finally, options may be considered to preserve water quality and reduce summer bacteria levels at certain swim areas in the study area.



### Interpretation and Education

I&E-related facilities and programs, such as informational kiosks, signage, information dissemination, and interpretive trails or campfires, have the potential to enhance visitor experiences and help modify visitor behavior to increase human safety and protect natural and cultural resources. An overall I&E program is proposed that would address issues such as options for a visitors center, programs for disseminating information, directing visitors to appropriate facilities, educating visitors about cultural resource protection, and others.

### Non-motorized Trails

The study area has a significant amount of multi-use, non-motorized trails. Most trails are in good condition and user conflicts are low. However, some trail loop connections are missing, and trail access could be improved in some locations. A Comprehensive Non-Motorized Trails Program is proposed to address the entire trails network. It would explore the possibility of developing new trails and looking at trail use zoning, among others.

### Fishing

Fishing (boat and bank) is a very popular activity in the study area as many opportunities exist at the Project reservoirs and along the Low Flow Channel and greater Feather River. Public safety issues at peak fishing periods have been noted, particularly in the OWA, requiring additional management presence and/or law enforcement during peak use periods. Other fishing-related enhancements proposed include additional signage, trash pickup, shoreline access sites, fish cleaning stations, and ADA-compliant fishing piers or platforms. Many of the boating-related improvements will also enhance fishing opportunities.

### General Open Space Activities

The study area contains a significant amount of undeveloped public open space that is mostly available for general public use. However, steep slopes are common in the Lake Oroville area and generally limit public access to a smaller area. In addition to providing open space-dependent recreation opportunities, such as wildlife observation and hunting, open space areas provide habitat for many wildlife species. As the population continues to increase over time, these public areas become more important and should be preserved. A few needs were identified related to hunting, including opening some locked gates earlier to provide improved access to the OWA during hunting season, providing additional law enforcement, and improved litter pickup, primarily at the OWA. Additionally, OHV use was noted where not allowed or appropriate. As a result, certain sensitive areas should be barricaded to minimize OHV use, while OHV riding opportunities continue to be provided at the Clay Pit SVRA (the SVRA is outside the FERC boundary).

### **Summary of Recreation Needs for Capital Improvements, Operations and Maintenance, and Programmatic Actions**

Below is a brief summary of the public recreation needs for the Oroville Facilities area that were identified in this study. A more detailed list of facility capital improvements, ongoing O&M, and programmatic recreation-related needs by site is summarized in Table 6.1-1 of this report and is also included in this Report Summary at the end (Table RS-1).

#### **Recreation Facility Capital Improvement Needs**

- € Continue to provide ADA-compliant facilities at developed recreation sites through the anticipated new license term. Modify as needed over the term of the new license as ADA guidelines are amended.
- € Harden some existing dispersed use sites to minimize resource impacts and to provide additional visitor access. Monitor user impacts over the term of the anticipated new license and harden or close some sites as necessary.
- € Enhance existing boat ramps (specifically at Lake Oroville) by extending ramp lanes where and when feasible, providing additional parking when needed, improving car-top boat ramps, and installing additional boarding docks at specific sites, among other actions.
- € Continue to restore the Lime Saddle Marina facility that was damaged by a wind storm, working with DPR and the concessionaire.
- € If feasible and cost-effective, provide or improve swimming opportunities at Lake Oroville and North Thermalito Forebay. Consider cost-effective and feasible options to meet this need.
- € As part of a proposed I&E Program, provide various program elements including kiosks, signs, and information dissemination.
- € As part of a proposed Comprehensive Non-Motorized Trails Program, improve trail-related opportunities such as new trail loop connections, improved trail access at some locations, and trailheads.
- € Where feasible, provide additional shoreline fishing-related facilities including improved and/or new shoreline access sites and additional regulatory and informational signs.
- € Maintain existing public undeveloped open space land for hunting, wildlife observation, and other dispersed activities. Provide adequate public access to these public lands.
- € Where feasible and cost-effective, consider clustering of and connections between developed recreation facilities (e.g., picnic areas, trails, campgrounds, group camps, boat ramps, etc.) to provide increased

synergy among recreation opportunities and to enhance visitor satisfaction.

- € Provide additional camping capacity (approximately 75-100 new campsites) at Lake Oroville recreation areas over the anticipated term of the new license when the need is demonstrated by a proposed monitoring program. Provide additional group campsites when needed as well.

#### Recreation Operations and Maintenance and Programmatic Needs

- € Continue to provide adequate O&M at developed recreation sites and use areas through the new license term.
- € Periodically monitor recreational use, visitor perceptions, and resource impacts through the anticipated new license term, to determine when existing sites should be improved or enhanced, when new sites should be constructed, or when resource impacts require mitigation.
- € Obtain and provide real-time information on river flow and reservoir pool levels in the Oroville Facilities area.
- € Provide additional visitor management and law enforcement presence, especially in the OWA and during specific seasons of use (e.g., fishing and hunting seasons).
- € Clarify and adequately fund state agency recreation-related management responsibilities through the term of the anticipated new license.
- € Provide opportunities for periodic stakeholder input regarding the management of recreation resources over the term of the anticipated new license.
- € Develop and implement additional measures related to managing resource impacts (e.g., OHV use impacts, litter accumulation and dumping, dispersed use impacts, etc.) and enhancing visitor safety (e.g., incident and accident reporting, visitor management control, wildland fire evacuation, etc.).

**INSERT TABLE (21 pages, 11 x 17 - odd numbered only)**

**Table RS-1. Summary of Existing and Potential Future Recreation Needs on a Site-by-Site Basis in the Oroville Facilities Area.**

Area/Site Location & Programmatic Needs	Reference Number	Existing Recreation Needs or Deficiencies (Current to 2010) <sup>1</sup>			Potential Future Recreation Needs (2011 to License Term) <sup>1</sup>			Overall Long-term Need or Current Deficiency Being Addressed During the Anticipated New License Term	Reference to Supporting Study Results and Other References
		Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations	Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations		
Lake Oroville									
Bidwell Canyon BR / Campground / DUA / Marina Complex	OR-1								
	OR-1a	No additional campsites at the Bidwell Canyon Campground are needed in the near term, except for potential relocation of existing campsites (approximately 50) nearby to provide space for marina parking needs						Provide adequate camping, day use and boating facilities	Study R-10, Section 5.1.1; Study R-8, Section 5.2.2.1; Study R-7, Sections 5.5.1.1 and 6.2
	OR-1b		Provide continued annual O&M; Continue to periodically monitor use levels at the Bidwell Canyon BR/DUA/ Campground/Marina Complex			Provide continued annual O&M; Continue to periodically monitor use levels at the Bidwell Canyon BR/DUA/ Campground/Marina Complex		Provide adequate annual O&M; Provide periodic monitoring	Study R-8, Sections 5.2.2.1 and 6.3; FERC guidelines
	OR-1c	Provide approximately 190 new vehicle parking spaces for use by Bidwell Canyon BR/DUA/Marina visitors						Provide adequate boating and day use facilities	Study R-7, Section 5.5.1.1; Study R-8, Section 5.5.2.1
	OR-1d	Reconstruct a new water-ski course near the Bidwell Canyon Marina, or other suitable location						Provide adequate boating facilities; Provide for resource protection	Study T-9; Resource integration
	OR-1e			Consider modifying the existing group use meeting hall (currently used for DPR storage) as a new campground activity facility				Provide adequate camping facilities; Provide for I&E	Professional judgment; Study R-13, Section 5.1.8

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		Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations	Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations		
	OR-1f		Provide more frequent adjustment of the boarding dock(s) at the boat ramp as needed					Provide adequate annual O&M; Provide adequate boating facilities	Study R-7; Study R-10; Field observations
	OR-1g	Provide an additional boarding dock(s) if feasible to maximizing boat launching capacity						Provide adequate boating facilities	Study R-7, Section 5.3.3
	OR-1h		Provide increased debris removal at boat ramps and adjacent facilities					Provide adequate annual O&M; Provide adequate boating facilities	Field observations; Studies R-7 and R-10
	OR-1i			Consider providing upgrades to ADA accessibility at the marina				Provide enhanced accessibility	Study R-6, Table 5.3-3
	OR-1j		Provide boaters with additional information about substitute boating facilities and changing access conditions			Provide boaters with additional information about substitute boating facilities and changing access conditions		Provide for I&E	Study R-3, Section 5.2.2.2, Tables 5.2-2, 5.2-3, R7 – Section 5.4.9, Table 5.4-18
	OR-1k			Consider providing temporary event grandstand space for use by concessionaires or event organizers during fishing tournaments			Consider providing temporary event grandstand space for use by event organizers during fishing tournaments	Provide enhanced fishing opportunities; Provide for I&E	Professional judgment
	OR-1l				Consider constructing new Bidwell Canyon campsite capacity elsewhere due to spatial capacity constraints at Bidwell Canyon, such as nearby Loafer Creek, and when monitoring results demonstrate a clear need			Provide adequate camping facilities	Study R-8, Section 5.5.1.1

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		Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations	Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations		
Loafer Creek BR / DUA / Campground / Group Campground / Equestrian Campground Complex	OR-2								
	OR-2a	Provide ADA-accessibility enhancements at the Loafer Creek Group and Equestrian Campgrounds						Provide for accessibility	Study R-6, Sections 5.3.1.3 and 6.0; Table 6.0-1
	OR-2b	Provide 2 new group RV campsites with utilities at the Loafer Creek Complex						Provide adequate camping facilities	Study R-8, Section 5.2.2.3
	OR-2c		Provide continued annual O&M; Periodically monitor use and impacts at the Loafer Creek boat ramp, DUA and campgrounds			Provide continued annual O&M; Periodically monitor use and impacts at the Loafer Creek boat ramp, DUA and campgrounds		Provide adequate annual O&M; Provide periodic monitoring	Study R-8, Sections 5.2.2.3, 5.5.2.3, and 6.3; FERC guidelines
	OR-2d	Conduct a feasibility study of potential swim facility options to provide improved swimming opportunities at Loafer Creek DUA during the primary 4-month recreation season						Provide adequate swimming facilities; Provide adequate shoreline access	Study R-3, Section 5.2.5, Table 5.2-6
	OR-2e			Consider providing a new campground activity facility				Provide adequate camping facilities; Provide for I&E	Professional judgment; Study R-13, Section 5.1.8
	OR-2f	Provide improved shoreline access and ADA-accessibility to the day use area and swimming beach, and cove						Provide for accessibility; Provide adequate shoreline access	Study R-6, Section 5.3.3.6

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		Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations	Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations		
	OR-2g	Provide low-water reservoir boating access in the Loafer Creek area to 750 feet msl						Provide adequate boating facilities	Study R-7, Section 5.3.4, Table 5.3-4; Study R-3, Section 5.2.2.2, Table 5.2-2
	OR-2h		Provide more frequent adjustment of the boarding dock(s) at the boat ramp as needed			Provide more frequent adjustment of the boarding dock(s) at the boat ramp as needed		Provide adequate annual O&M; Provide adequate boating facilities	Professional judgment; Field observations
	OR-2i	Provide additional boarding dock(s) if feasible to maximize launching capacity						Provide adequate boating facilities	Study R-7, Section 5.3.3
	OR-2j		Provide boaters with additional information about substitute boating facilities and changing reservoir conditions			Provide boaters with additional information about substitute boating facilities and changing reservoir conditions		Provide for I&E	Study R-3, Section 5.2.2.2, Tables 5.2-2, 5.2-3; Study R7 – Section 5.4.9, Table 5.4-18
	OR-2k		Provide increased debris removal at boat ramps and adjacent facilities			Provide increased debris removal at boat ramps and adjacent facilities		Provide for public health and safety; Provide adequate annual O&M; Provide adequate boating facilities	Professional judgment; Field observations
	OR-2l				Consider constructing approximately 50 new campsites and re-evaluating the current mix of campsite types based on monitoring results			Provide adequate camping facilities	Study R-8, Sections 5.2.2.3 and 6.3
	OR-2m				Consider providing a new fish cleaning station if fish waste becomes a problem			Provide adequate resource protection; Provide enhanced fishing opportunities	Professional judgment; Resource protection
	OR-2n				Consider providing 2 additional group campsites in the Loafer Creek Complex if needed based on monitoring results			Provide adequate camping facilities	Study R-8, Section 5.2.2.3



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		Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations	Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations		
	OR-2o				Consider providing additional parking at the boat ramp when monitoring results demonstrate a need			Provide adequate boating facilities	Study R-17, Sections 5.5.1.1, 5.5.1.4, Table 5.5-2
Lime Saddle BR / DUA / Campground / Marina Complex	OR-3								
	OR-3a		Provide continued annual O&M; Periodically monitor use levels and impacts at the Lime Saddle Complex			Provide continued annual O&M; Periodically monitor use levels and impacts at the Lime Saddle Complex		Provide adequate annual O&M; Provide periodic monitoring	Study R-8, Section 6.3; FERC guidelines
	OR-3b	Upgrade existing picnic tables and shade structures while maintaining views at Lime Saddle DUA						Provide adequate day use facilities	Professional judgment
	OR-3c	Restore the Lime Saddle Marina that was damaged by a wind storm, cooperating with DPR and the concessionaire						Provide adequate annual O&M; Provide adequate boating facilities; Provide for public health and safety	Study R-10, Table 6.0-2
	OR-3d			Consider providing temporary event grandstand space during fishing tournaments for use by event organizers			Consider providing temporary event grandstand space during fishing tournaments for use by event organizers	Provide for I&E; Provide enhanced fishing opportunities	Professional judgment
	OR-3e		Provide more frequent adjustment of the boarding dock(s) at the boat ramp as needed			Provide more frequent adjustment of the boarding dock(s) at the boat ramp as needed		Provide adequate annual O&M; Provide adequate boating facilities	Professional judgment; Field observations
	OR-3f			Consider upgrades to ADA-accessibility at marina				Provide enhanced accessibility	Professional judgment; ADA accessibility
	OR-3g	Provide additional boarding dock(s) if feasible to maximize launching capacity						Provide adequate boating facilities	Study R-7, Section 5.3.3

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		Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations	Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations		
	OR-3h	Provide a new courtesy dock for use by Lime Saddle Campground visitors below the campground in Parrish Cove, connected by a foot trail to the upper campground						Provide adequate shoreline access; Provide adequate boating facilities	Professional judgment
	OR-3i		Provide increased debris removal at boat ramps and adjacent facilities			Provide increased debris removal at boat ramps and adjacent facilities		Provide for public health and safety; Provide adequate annual O&M; Provide adequate boating facilities	Professional judgment; Field observations
	OR-3j		Provide boaters with additional information about substitute boating facilities and changing reservoir conditions			Provide boaters with additional information about substitute boating facilities and changing reservoir conditions		Provide for I&E	Study R-3, Section 5.2.2.2, Tables 5.2-2, 5.2-3; Study R-7, Section 5.4.9, Table 5.4-18
	OR-3k				Consider constructing approximately 25 to 50 new RV/tent campsites and other complex improvements if needed based on monitoring results			Provide adequate camping facilities	Study R-10, Section 5.1.1; Study R-8, Section 5.2.2.2 and 6.3
	OR-3l						Consider providing a new campground activity facility, if and when the campground is expanded in the future	Provide adequate camping facilities; Provide for I&E	Professional judgment; Study R-13, Section 5.1.8
	OR-3m				Consider providing 1 new group RV campsite with utilities at the Lime Saddle Complex based on monitoring results, if needed in the future			Provide adequate camping facilities	Study R-8, Section 5.2.2.2; Study R-12, Sections 5.2.2.3 and 5.2.3

**Table RS-1. Summary of Existing and Potential Future Recreation Needs on a Site-by-Site Basis in the Oroville Facilities Area.**

Area/Site Location & Programmatic Needs	Reference Number	Existing Recreation Needs or Deficiencies (Current to 2010) <sup>1</sup>			Potential Future Recreation Needs (2011 to License Term) <sup>1</sup>			Overall Long-term Need or Current Deficiency Being Addressed During the Anticipated New License Term	Reference to Supporting Study Results and Other References
		Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations	Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations		
	OR-3n				Consider providing a new shoreline day use area at Parrish Cove that is linked by trail access to the Lime Saddle Campground and Lime Saddle BR/DUA /Marina			Provide adequate shoreline access; Provide adequate day use facilities	Study R-12, Sections 5.2.2.3 and 5.3
	OR-3o						Consider providing new swimming opportunities in the future at Lime Saddle during the primary 4-month recreation season; conducting a feasibility study of costs, benefits, and options (Loafer Creek is a higher priority site for potential swimming facilities)	Provide adequate swimming facilities where feasible and cost effective; Provide adequate shoreline access where feasible	Study R-3, Section 5.3; Study R-5, Section 5.3, Figure 5.3-1
	OR-3p				Consider constructing 50-60 vehicle parking spaces at the Lime Saddle BR/DUA/Marina, consider the adjacent PG&E property			Provide adequate boating and day use facilities	Study R-7, Section 5.5.1.1, Table 5.5-2
<b>Spillway BR / DUA</b>	OR-4 OR-4a		Provide continued annual O&M; Periodically monitor recreation use levels at the Spillway Complex			Provide continued annual O&M; Periodically monitor recreation use levels at the Spillway Complex		Provide adequate annual O&M; Provide periodic monitoring	FERC guidelines
	OR-4b	Review RV "En Route" camping at this site due to low use and modify facilities or operations, as needed						Provide adequate camping facilities	Study R-8, Section 5.2.2.6; Study R-9, Section 5.2.1.1, Table 5.2-1
	OR-4c		Provide more frequent adjustment of the boarding docks at the boat ramp as needed			Provide more frequent adjustment of the boarding docks at the boat ramp as needed		Provide adequate annual O&M; Provide adequate boating facilities	Professional judgment; Field observations

**Table RS-1. Summary of Existing and Potential Future Recreation Needs on a Site-by-Site Basis in the Oroville Facilities Area.**

Area/Site Location & Programmatic Needs	Reference Number	Existing Recreation Needs or Deficiencies (Current to 2010) <sup>1</sup>			Potential Future Recreation Needs (2011 to License Term) <sup>1</sup>			Overall Long-term Need or Current Deficiency Being Addressed During the Anticipated New License Term	Reference to Supporting Study Results and Other References
		Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations	Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations		
	OR-4d		Provide increased debris removal at boat ramps and adjacent facilities			Provide increased debris removal at boat ramps and adjacent facilities		Provide for public health and safety; Provide adequate annual O&M; Provide adequate boating facilities	Professional judgment; Field observations
	OR-4e		Provide boaters with additional information about substitute boating facilities and changing reservoir conditions			Provide boaters with additional information about substitute boating facilities and changing reservoir conditions		Provide for I&E	Study R-3, Section 5.2.2.2, Tables 5.2-2, Table 5.2-3; Study R-7 – Section 5.4.9, Table 5.4-18
	OR-4f	Extend the boat ramp length below 695 feet msl (when possible)			Extend the boat ramp length below 695 feet msl (when possible)			Provide adequate shoreline access; Provide adequate boating facilities	Study R-7, Section 5.3.4, Tables 5.3-4 and 5.3-5
	OR-4g			Consider providing a floating concessionaire-run store and gas dock at the Spillway BR to serve boaters				Provide adequate boating facilities	Professional judgment; Study R-13, Section 5.1.2.6, Table 5.1-26
<b>Enterprise BR</b>	OR-5 OR-5a	Construct 5-10 family picnic sites						Provide adequate shoreline day use facilities	Professional judgment
	OR-5b	Extend the boat ramp length to 750 feet msl to provide a greater likelihood of full summer-season usability						Provide adequate shoreline access; Provide adequate boating facilities	Study R-7, Section 5.3.4, Table 5.3-4; Study R-3, Section 5.2.2.2, Table 5.2-2
	OR-5c	Provide a boarding dock at the boat ramp						Provide adequate boating facilities	Study R-7, Section 5.3.3
	OR-5d		Provide continued annual O&M and periodic monitoring			Provide continued annual O&M and periodic monitoring		Provide adequate annual O&M; Provide periodic monitoring	FERC guidelines
<b>Nelson Bar Car-top BR</b>	OR-6 OR-6a		Provide continued annual O&M and periodic monitoring			Provide continued annual O&M and periodic monitoring		Provide adequate annual O&M; Provide periodic monitoring	FERC guidelines

**Table RS-1. Summary of Existing and Potential Future Recreation Needs on a Site-by-Site Basis in the Oroville Facilities Area.**

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		Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations	Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations		
Vinton Gulch Car-top BR	OR-7								
	OR-7a	Provide additional directional signs as a component of a proposed I&E Program						Provide for I&E	Professional judgment
	OR-7b		Provide continued annual O&M and periodic monitoring			Provide continued annual O&M and periodic monitoring		Provide adequate annual O&M; Provide periodic monitoring	FERC guidelines
Dark Canyon Car-top BR	OR-8								
	OR-8a	Providing additional directional signs as a component of a proposed I&E Program						Provide for I&E	Professional judgment
	OR-8b	Replace the vault toilet building that was vandalized						Provide for public health and safety; Provide for resource protection; Provide adequate day use and boating facilities	Professional judgment
	OR-8c		Provide continued annual O&M and periodic monitoring			Provide continued annual O&M and periodic monitoring		Provide adequate annual O&M; Provide periodic monitoring	FERC guidelines
Foreman Creek Car-top BR	OR-9								
	OR-9a	Provide additional visitor education regarding the preservation of cultural and other sensitive resources at the site as a component of the proposed I&E Program						Provide for I&E; Provide for resource protection	Professional judgment
	OR-9b		Provide continued annual O&M and periodic monitoring; Provide increased trash pick-up			Provide continued annual O&M and periodic monitoring; Provide increased trash pick-up		Provide adequate annual O&M; Provide periodic monitoring	Study R-4, Table 6.1-1; FERC guidelines

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		Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations	Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations		
	OR-9c	Improve shoreline conditions and provide other basic day-use amenities to facilitate use of the area, including swimming						Provide adequate day use facilities and shoreline access	Study R-3, Section 5.2.3.4
<b>Stringtown Car-top BR</b>	OR-10 OR-10a	Provide additional directional signs as a component of a proposed I&E Program						Provide for I&E	Professional judgment
	OR-10b	Repair or replace the crumbling asphalt road and eroding road bed within the inundation zone						Provide adequate annual O&M; Provide adequate boating facilities; Provide for resource protection	Study R-3, Section 5.2.3.5; Study R10, Section 5.1.4.16
	OR-10c		Provide continued annual O&M and periodic monitoring; Periodically monitor water quality at this location that is used for swimming			Provide continued annual O&M and periodic monitoring; Periodically monitor water quality at this location that is used for swimming		Provide adequate annual O&M; Provide periodic monitoring	FERC guidelines; Resource protection; Preliminary data from the Environmental Work Group; Studies W-1 and W-3
<b>Lake Oroville Visitors Center</b>	OR-11 OR-11a				Consider providing additional parking capacity in the future			Provide for I&E; Provide adequate day use facilities	Study R-8, Section 5.4.2.1, Table 5.4-1; Study R-12, Sections 5.3.1.4 and 5.3.2, Table 5.3-2
	OR-11b						Consider alternative uses and locations for the Visitors Center as part of the proposed I&E Program	Provide for I&E; Provide for resource protection	Study R-10, Table 6.0-2
	OR-11c		Provide continued annual O&M and periodic monitoring			Provide continued annual O&M and periodic monitoring		Provide adequate annual O&M; Provide periodic monitoring	FERC guidelines

**Table RS-1. Summary of Existing and Potential Future Recreation Needs on a Site-by-Site Basis in the Oroville Facilities Area.**

Area/Site Location & Programmatic Needs	Reference Number	Existing Recreation Needs or Deficiencies (Current to 2010) <sup>1</sup>			Potential Future Recreation Needs (2011 to License Term) <sup>1</sup>			Overall Long-term Need or Current Deficiency Being Addressed During the Anticipated New License Term	Reference to Supporting Study Results and Other References
		Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations	Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations		
Saddle Dam Trailhead Access	OR-12								
	OR-12a	Construct short developed trails to access the shoreline						Provide adequate shoreline access	Study R-11. Sections 6.1.2.3, 6.2.1
	OR-12b		Provide continued annual O&M and periodic monitoring			Provide continued annual O&M and periodic monitoring		Provide adequate annual O&M; Provide periodic monitoring	FERC guidelines
Bloomer Area BICs	OR-13 OR-13a		Provide continued annual O&M and periodic monitoring			Provide continued annual O&M and periodic monitoring		Provide adequate annual O&M; Provide periodic monitoring	FERC guidelines
Goat Ranch BIC	OR-14 OR-14a		Provide continued annual O&M and periodic monitoring			Provide continued annual O&M and periodic monitoring		Provide adequate annual O&M; Provide periodic monitoring	FERC guidelines
Foreman Creek BIC	OR-15 OR-15a		Provide continued annual O&M and periodic monitoring			Provide continued annual O&M and periodic monitoring		Provide adequate annual O&M; Provide periodic monitoring	FERC guidelines
Craig Saddle BIC	OR-16 OR-16a		Provide continued annual O&M and periodic monitoring			Provide continued annual O&M and periodic monitoring		Provide adequate annual O&M; Provide periodic monitoring	FERC guidelines
Oroville Dam Overlook DUA	OR-17 OR-17a				Consider constructing 30-50 additional vehicle parking spaces			Provide for I&E; Provide adequate day use facilities	Study R-8. Section 5.4.2.3, Table 5.4-1; Study R-12. Sections 5.3.1 and 5.3.2, Table 5.3-2
	OR-17b		Provide continued annual O&M and periodic monitoring			Provide continued annual O&M and periodic monitoring		Provide adequate annual O&M; Provide periodic monitoring	FERC guidelines
Floating Campsites	OR-18 OR-18a	Provide two or three additional floating campsites on Lake Oroville						Provide adequate boating and camping facilities; Provide adequate shoreline access	Study R-7. Section 5.2, Table 5.2-13

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Area/Site Location & Programmatic Needs	Reference Number	Existing Recreation Needs or Deficiencies (Current to 2010) <sup>1</sup>			Potential Future Recreation Needs (2011 to License Term) <sup>1</sup>			Overall Long-term Need or Current Deficiency Being Addressed During the Anticipated New License Term	Reference to Supporting Study Results and Other References
		Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations	Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations		
	OR-18b		Provide continued annual O&M and periodic monitoring			Provide continued annual O&M and periodic monitoring		Provide adequate annual O&M; Provide periodic monitoring	FERC guidelines
Upper North Fork Arm Below Poe Powerhouse	OR-19								
	OR-19a						Consider providing a future boater take-out, if feasible, or a potential non-motorized watercraft tow service for whitewater boaters who run the North Fork Feather River from the PG&E Poe Powerhouse to the Lake Oroville flatwater	Provide adequate shoreline access; Provide adequate boating facilities	Study R-16, Section 6.1.3
	OR-19b						Consider obtaining and providing real time river flow data below the PG&E Poe Project powerhouse (coordinate and obtain from PG&E) and providing Lake Oroville reservoir pool level data for use by whitewater boaters; Provide this information to the public via the Internet, flow phone, or other means	Provide for I&E	Study R-16, Section 6.1.3
	OR-19c		Provide periodic monitoring			Provide periodic monitoring		Provide periodic monitoring	FERC guidelines



**Table RS-1. Summary of Existing and Potential Future Recreation Needs on a Site-by-Site Basis in the Oroville Facilities Area.**

Table RS-1: Summary of Existing and Potential Future Recreation Needs on a Site-by-Site Basis in the Grovins Facilities Area:									
Area/Site Location & Programmatic Needs	Reference Number	Existing Recreation Needs or Deficiencies (Current to 2010) <sup>1</sup>			Potential Future Recreation Needs (2011 to License Term) <sup>1</sup>			Overall Long-term Need or Current Deficiency Being Addressed During the Anticipated New License Term	Reference to Supporting Study Results and Other References
		Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations	Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations		
Diversion Pool									
Diversion Pool DUA	DP-1 DP-1a	Construct additional day use facilities including approx. 5-10 new picnic tables with pole grills and a gravel car-top boat ramp near the vault toilet building along the Diversion Pool along the Burma Road						Provide adequate day use and boating facilities; Provide adequate shoreline access	Professional judgment; Study R-13, Section 5.1.2.6, Table 5.1-28.
	DP-1b		Provide continued annual O&M and periodic monitoring			Provide continued annual O&M and periodic monitoring		Provide adequate annual O&M; Provide periodic monitoring	FERC guidelines
	DP-1c	Consider providing an ADA-accessible fishing pier or platform						Provide for accessibility; Provide enhanced fishing opportunities	ADA accessibility; Professional judgment
Lakeland Blvd. Trail Access Area	DP-2 DP-2a	Provide a new southern shoreline day use/picnic site with car-top boat launching at the Diversion Pool and direct road access from the Lakeland Boulevard Trailhead Access area						Provide adequate day use and boating facilities; Provide adequate shoreline access	Professional judgment
	DP-2b		Provide continued annual O&M and periodic monitoring			Provide continued annual O&M and periodic monitoring		Provide adequate annual O&M; Provide periodic monitoring	
	DP-2c	Provide expanded trailhead facilities at the Lakeland Boulevard Trailhead Access site to access the Diversion Pool						Provide adequate shoreline access	Professional judgment

**Table RS-1. Summary of Existing and Potential Future Recreation Needs on a Site-by-Site Basis in the Oroville Facilities Area.**

Area/Site Location & Programmatic Needs	Reference Number	Existing Recreation Needs or Deficiencies (Current to 2010) <sup>1</sup>			Potential Future Recreation Needs (2011 to License Term) <sup>1</sup>			Overall Long-term Need or Current Deficiency Being Addressed During the Anticipated New License Term	Reference to Supporting Study Results and Other References
		Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations	Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations		
Low Flow Channel / Feather River									
Feather River Fish Hatchery	FR-1 FR-1a		Provide continued annual O&M and periodic monitoring; Also, potential I&E-related enhancements would be considered here under the proposed I&E Program			Provide continued annual O&M and periodic monitoring; Also, potential I&E-related enhancements would be considered here under the proposed I&E Program		Provide adequate annual O&M; Provide periodic monitoring	FERC guidelines; see proposed I&E program
Riverbend Park	FR-2 FR-2a		Continue to coordinate with the FRRPD and other interested parties in the planning, design, and construction of Riverbend Park					Provide enhanced shoreline access; Provide for I&E; Provide for resource protection; Provide adequate day use facilities	Professional judgment
Thermalito Forebay									
North Thermalito Forebay BR / DUA / Aquatic Center / "En-Route" Campground	TF-1 TF-1a		Provide continued annual O&M and periodic monitoring			Provide continued annual O&M and periodic monitoring		Provide adequate annual O&M; Provide periodic monitoring	FERC guidelines
	TF-1b	Evaluate options to potentially warm the water for enhanced swimming opportunities and help protect water quality in the swim area						Provide adequate swimming facilities; Provide for public health and safety; Enhance swimming opportunities	Study R-3, Sections 5.1.1.2, 5.2.6.1, Table 5.1-3
	TF-1c	Provide new non-motorized trail loop opportunities in the Thermalito Forebay area as a component of the proposed trails program						Provide adequate shoreline access	Study R-13, Section 5.1.2.6

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		Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations	Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations		
	TF-1d	Provide additional shoreline trail access points						Provide adequate shoreline access	Study R-3, Report Summary; Study R-4, Table 6.1-1
	TF-1e			Consider providing basic improvements to the Aquatics Center to complete the facility for basic needs				Provide for I&E; Provide enhanced boating opportunities	Professional judgment; Field observations
	TF-1f				Consider providing a fish cleaning station if waste problems are encountered			Provide for resource protection; Provide enhanced fishing opportunities	Professional judgment; Resource protection
	TF-1g				Consider options for camping in the future to potentially replace current RV "En Route" camping at this site			Provide adequate camping facilities	Study R-8, Section 5.2.2.5; Study R-9, Section 5.2.1.3 and Table 5.2-3
South Thermalito Forebay BR / DUA	TF-2								
	TF-2a	Provide an ADA accessible fishing pier or platform						Provide for accessibility; Provide enhanced fishing opportunities	FERC guidelines; professional judgment; Study R-6
	TF-2b		Provide continued annual O&M and periodic monitoring; Provide periodic water quality monitoring			Provide continued annual O&M and periodic monitoring; Provide periodic water quality monitoring		Provide adequate annual O&M; Provide periodic monitoring	Study W-3, selected data on sites with water quality concerns; FERC guidelines
	TF-2c	As a component of a proposed Comprehensive Non-Motorized Trails Plan, provide new trail opportunities in the South Thermalito Forebay area						Provide adequate shoreline access	Study R-13, Section 5.1.2.6
	TF-2d	Provide improved day use and swimming facilities at the South Forebay to enhance visitor use of the area						Provide adequate day use and swimming facilities	Professional judgment; Resource protection

**Table RS-1. Summary of Existing and Potential Future Recreation Needs on a Site-by-Site Basis in the Oroville Facilities Area.**

Table R-1. Summary of Existing and Potential Future Recreation Needs on a Site-by-Site Basis in the Grovina Facilities Area.									
Area/Site Location & Programmatic Needs	Reference Number	Existing Recreation Needs or Deficiencies (Current to 2010) <sup>1</sup>			Potential Future Recreation Needs (2011 to License Term) <sup>1</sup>			Overall Long-term Need or Current Deficiency Being Addressed During the Anticipated New License Term	Reference to Supporting Study Results and Other References
		Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations	Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations		
Thermalito Afterbay									
Wilbur Road BR	TA-1 TA-1a	As a component of the proposed I&E Program, provide a directional sign(s)						Provide for I&E	Study R-1, Table 6.3-1
	TA-1b		Provide continued annual O&M and periodic monitoring			Provide continued annual O&M and periodic monitoring		Provide adequate annual O&M; Provide periodic monitoring	FERC guidelines
	TA-1c		Reduce boat speeds on the Thermalito Afterbay					Provide for resource protection	Study R-4, Section 5.2.7.4; Resource integration
	TA-1d				Consider constructing 5-10 additional vehicle parking spaces			Provide adequate boating and day use facilities	Study R-7, Section 5.5.1.1, Table 5.5-2
Larkin Road Car-top BR	TA-2 TA-2a	Construct 5-10 new family picnic tables with shade structures at this site						Provide adequate day use facilities	Professional judgment
	TA-2b	As a component of the proposed I&E Program, provide new directional signs						Provide for I&E	Professional judgment
	TA-2c		Reduce boat speeds on the Thermalito Afterbay					Provide for resource protection	Study R-4, Section 5.2.7.4
	TA-2d		Provide continued annual O&M and periodic monitoring			Provide continued annual O&M and periodic monitoring		Provide adequate annual O&M; Provide periodic monitoring	FERC guidelines
	TA-2e	Provide a swim beach area and other day-use enhancements						Provide adequate day use and swimming facilities	Study R-11, Section 5.2.2.1, Table 5.2-2
Monument Hill BR / DUA	TA-3 TA-3a		Reduce boat speeds on the Thermalito Afterbay					Provide for resource protection	Study R-4, Section 5.2.7.4
	TA-3b		Provide continued annual O&M and periodic monitoring			Provide continued annual O&M and periodic monitoring		Provide adequate annual O&M; Provide periodic monitoring	FERC guidelines

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		Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations	Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations		
Model Aircraft Flying Area	TA-4								
	TA-4a		Provide continued annual O&M and periodic monitoring			Provide continued annual O&M and periodic monitoring		Provide adequate annual O&M; Provide periodic monitoring	FERC guidelines
Clay Pit SVRA	TA-5 TA-5a		Manage the Clay Pit SVRA to accommodate continued OHV use			Manage the Clay Pit SVRA to accommodate continued OHV use		Provide adequate visitor management; Provide for resource protection	Study R-11, Section 6.1.2
<b>Oroville Wildlife Area</b>									
OWA Afterbay Outlet BR / DUA / Campsites	WA-1 WA-1a	Evaluate the practice of allowing undeveloped camping in the OWA and implement actions						Provide adequate camping facilities; Provide for resource protection; Provide adequate annual O&M	Professional judgment; Resource protection
	WA-1b		Provide increased visitor management and enforcement in the OWA to enforce fishing and other use restrictions			Provide increased visitor management and enforcement in the OWA to enforce fishing and other use restrictions		Provide adequate visitor management; Provide for resource protection	Study R-4, Table 6.1-1
	WA-1c	As a component of the I&E Program, provide additional directional signs						Provide for I&E	Study R-10, Table 6.0-2
	WA-1d		Provide continued annual O&M and periodic monitoring			Provide continued annual O&M and periodic monitoring		Provide adequate annual O&M; Provide periodic monitoring	FERC guidelines
	WA-1e		Evaluate options to provide additional revenue for new services or facilities in the OWA					Provide adequate visitor management; Provide for resource protection; Resolve long-term funding and management issues	Study R-5, Section 6.2.1.4; Professional judgment

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		Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations	Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations		
OWA River, Pond Access, and General Dispersed Sites	WA-2								
	WA-2a	Provide additional trash receptacles and signage, particularly along the river, at access points where trash accumulation appears to be a problem	Provide additional trash pickup, particularly along the river, at access points where trash accumulation appears to be a problem					Provide adequate annual O&M; Provide for resource protection	Study R-4, Table 6.1-1; Study R-11, Sections 6.1 and 6.2
	WA-2b	As part of the I&E Program, post both regulatory and educational signs detailing illegal fishing practices and consequences of using these practices						Provide for I&E; Provide for resource protection	Study R-4, Table 6.1-1
	WA-2c		Provide more enforcement at these sites to enforce fishing and other regulations			Provide more enforcement at these sites to enforce fishing and other regulations		Provide adequate visitor management; Provide for resource protection	Study R-4, Table 6.1-1
	WA-2d		Provide continued annual O&M; As a component of a recreation monitoring program, provide periodic monitoring to assess future needs, particularly the Afterbay outlet area			Provide continued annual O&M; As a component of a recreation monitoring program, provide periodic monitoring to assess future needs, particularly the Afterbay outlet area		Provide adequate annual O&M; Provide periodic monitoring	FERC guidelines; Resource protection
	WA-2e	Erect vehicular barriers to selected areas in the OWA						Provide for resource protection	Study R-11, Section 6.1.2.1
	WA-2f		Open locked gates in the OWA earlier during the peak use hunting season to accommodate hunters			Open locked gates in the OWA earlier during the peak use hunting season to accommodate hunters		Enhance hunting opportunities	Study R-4, Section 6.1.8, Table 6.1-1

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		Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations	Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations		
	WA-2g			Consider locating and operating 2 ADA-accessible Watchable Wildlife sites within the OWA as part of the proposed I&E Program				Provide for accessibility; Provide for I&E	Professional judgment; ADA accessibility
	WA-2h						Consider constructing 2 additional ADA-accessible Watchable Wildlife sites within the OWA	Provide for accessibility; Provide for I&E	Professional judgment; ADA accessibility
Rabe Road Shooting Range	WA-3								
	WA-3a		Continue to provide this site as a public shooting range			Continue to provide this site as a public shooting range		Provide adequate visitor management; Provide for resource protection	Study R-11, Section 6.2.1
	WA-3b		Provide more trash receptacles and provide additional litter pick-up at this site			Provide more trash receptacles and provide additional litter pick-up at this site		Provide adequate annual O&M; Provide for resource protection	Study R-11, Section 6.2.1
<b>Dispersed Use Sites - General</b>									
	DU-1	Provide more trash receptacles at dispersed use areas, where needed	Provide continued annual O&M; Provide more trash pick-up and provide additional scattered litter pick-up at dispersed use areas, where needed			Provide continued annual O&M		Provide adequate annual O&M;	Study R-11, Sections 6.1 and 6.2
	DU-2		Provide periodic monitoring; Periodically monitor study area for potential new dispersed use sites			Provide periodic monitoring; Periodically monitor study area for potential new dispersed use sites		Provide periodic monitoring	FERC guidelines; Professional judgment; Resource protection
<b>Programmatic Needs</b>									
	P-1		Clarify agency recreation-related management responsibilities and long-term funding					Provide adequate annual O&M; Address long-term funding problems; Provide clarity of responsibilities of agencies	Studies R-4 and R-5

**Table RS-1. Summary of Existing and Potential Future Recreation Needs on a Site-by-Site Basis in the Oroville Facilities Area.**

Area/Site Location & Programmatic Needs	Reference Number	Existing Recreation Needs or Deficiencies (Current to 2010) <sup>1</sup>			Potential Future Recreation Needs (2011 to License Term) <sup>1</sup>			Overall Long-term Need or Current Deficiency Being Addressed During the Anticipated New License Term	Reference to Supporting Study Results and Other References
		Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations	Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations		
	P-2	Develop a proposed Recreation Monitoring Program; Implement proposed capital measures	Develop a proposed Recreation Monitoring Program; Implement proposed O&M-related measures		Continue to implement proposed Recreation Monitoring Program - capital measures	Continue to implement proposed Recreation Monitoring Program - O&M-related measures		Provide periodic monitoring	FERC guidelines; Resource protection
	P-3		Implement additional programmatic recreation-related operations and maintenance actions including: (1) managing OHV use impacts, (2) managing litter accumulation and dumping, (3) managing user defined trails, and (4) managing dispersed site pioneering and creep			Continue to implement proposed management actions		Provide for resource protection; Provide adequate annual O&M; Provide adequate visitor management	Studies R-4 and R-11; Resource protection; Resource integration
	P-4		Implement additional safety-related actions over time including: (1) improved incident and accident reporting, (2) improved visitor education and management control, and (3) other additional safety-related actions over time			Continue to implement additional safety-related actions as needed		Provide for adequate public health and safety	Study R-2
	P-5		Develop a proposed Wildland Fire Evacuation Plan for the OWA; Implement the proposed OWA Wildland Fire Evacuation Plan measures			Continue to implement a proposed OWA Wildland Fire Evacuation Plan		Provide for adequate public health and safety; Provide for resource protection	Study R-4
	P-6	Develop a proposed Comprehensive Non-motorized Trails Program; Implement proposed Trails Program capital measures	Develop a proposed Comprehensive Non-motorized Trails Program; Implement proposed Trails Program O&M measures		Continue to implement proposed Trails Program capital measures	Continue to implement proposed Trails Program O&M measures		Provide adequate shoreline access; Provide for resource protection	Studies R-10, R-13 and R-14



**Table RS-1. Summary of Existing and Potential Future Recreation Needs on a Site-by-Site Basis in the Oroville Facilities Area.**

Area/Site Location & Programmatic Needs	Reference Number	Existing Recreation Needs or Deficiencies (Current to 2010) <sup>1</sup>			Potential Future Recreation Needs (2011 to License Term) <sup>1</sup>			Overall Long-term Need or Current Deficiency Being Addressed During the Anticipated New License Term	Reference to Supporting Study Results and Other References
		Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations	Capital Improvements	Operations and Maintenance / Programmatic	Other Considerations		
	P-7	Develop a proposed I&E Program; Implement proposed capital measures	Develop a proposed I&E Program; Implement proposed O&M measures		Continue to implement proposed I&E Program capital measures	Continue to implement proposed I&E Program O&M measures		Provide for I&E	Resource protection; Studies R-1, R-2, R-4, R-5, R-10, R-11, R-13, and W-3

<sup>1</sup>Capital improvements are actions with one time costs such as construction of a facility; operations and maintenance (O&M) actions are annual or periodic non-construction actions or costs; programmatic actions are program-related actions that address broader needs; and “other considerations” are lesser priority needs that may also be considered.

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## ACRONYMS AND ABBREVIATIONS

ACC	Area Control Center
ADA	Americans with Disabilities Act
ADAAG	Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities
af	acre-feet
ATV	all-terrain vehicle
BIC	boat-in campground
BR	boat ramp
BSC	Butte Sailing Club
cfs	cubic feet per second
DBW	California Department of Boating and Waterways
DFG	California Department of Fish and Game
DHS	California Department of Health Services
DPR	California Department of Parks and Recreation
DUA	Day Use Area
DWR	California Department of Water Resources
FERC	Federal Energy Regulatory Commission
FRRPD	Feather River Recreation and Parks District
FRSA	Feather River Service Area
GIS	geographic information system
I&E	Interpretation and Education
ISO	California Independent System Operator
LOSRA	Lake Oroville State Recreation Area
maf	million acre-feet
MFFR	Middle Fork Feather River
msl	mean sea level
MOA	Memorandum of Agreement
MW	megawatts
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
O&M	operations and maintenance
OHV	off-highway vehicle
OWA	Oroville Wildlife Area
PFD	personal floatation device
PG&E	Pacific Gas and Electric Company
PM&E	protection, mitigation, and enhancement
PWC	personal watercraft
RD	recreation day
RMP	Recreation Management Plan
ROS	Recreation Opportunity Spectrum
RSWG	Recreation and Socioeconomics Work Group
RV	Recreational Vehicle
RVD	recreation visitor day

### **ACRONYMS AND ABBREVIATIONS (cont.)**

SR	State Route
SRA	State Recreation Area
SVRA	State Vehicular Recreation Area
SWP	State Water Project
USACE	U.S. Army Corps of Engineers
USFS	U.S. Forest Service
UTAP	Universal Trail Assessment Process

## 1.0 INTRODUCTION

This report (Study R-17 – *Recreation Needs Analysis*) is the capstone technical recreation resource study related to the Oroville Facilities relicensing. This report synthesizes the results of the other technical recreation studies and identifies and estimates a comprehensive list of existing and future public recreation needs for the Oroville Facilities study area.

This report is divided into the following seven sections:

- € **Introduction** – Provides background information on the Oroville Facilities and this study;
- € **Need for Study** – Addresses why this study is necessary to complete the relicensing process;
- € **Study Objectives** – Discusses the purpose of the study;
- € **Methodology** – Describes how data from the recreation studies were evaluated and incorporated into the study;
- € **Study Results** – Analyzes and synthesizes the results and conclusions of other relicensing studies to define results regarding overall “big picture” recreation needs in the study area;
- € **Conclusions** – Discusses conclusions regarding how the overall “big picture” recreation needs are allocated and further defined on a site-specific basis in the study area; and
- € **References** – Lists the references used to complete the study.

In this study, a public recreation need is defined as an existing recreation-related condition, or anticipated future condition, that may be altered by implementation of actions that create, preserve, or enhance public recreation opportunities in the Oroville Facilities study area. Typical public recreation needs may be related to items such as: providing adequate public health and safety, compliance with the Americans with Disabilities Act (ADA), protecting natural and cultural resources in recreation areas, providing adequate public access to Project lands and shorelines, and providing and maintaining adequate public recreation facilities and use areas. For the purposes of FERC relicensing, a public recreation need is typically related to Project operations, the Project water bodies, and is water-related. A public recreation need is also typically within or immediately adjacent to the FERC boundary.

Potential recreation resource actions that are aimed at enhancing economic development in the area or region, or in meeting recreation needs originating outside the Oroville Facilities area, are not considered recreation needs in this study and are not included in the results. These potential actions may be best addressed by stakeholders during Settlement Negotiations and the development of a subsequent recreation management plan, or addressed outside the context of this relicensing.

## **1.1 BACKGROUND INFORMATION**

The California Department of Water Resources (DWR) commissioned this study as part of the relicensing process for the preparation of a license application to be submitted to the Federal Energy Regulatory Commission (FERC) for the Oroville Facilities (FERC Project No. 2100). As part of this relicensing process, related studies are being conducted to assess and evaluate recreation resources associated with the Oroville Facilities.

Lake Oroville is the second largest reservoir in California, after Shasta Lake. Existing facilities at Lake Oroville offer a wide variety of recreational opportunities. These include numerous facilities for visitors to boat, fish, and camp. Opportunities to camp in the area include fully developed, primitive, boat-in, and floating campsites. Boating facilities include two full-service marinas, six boat ramps, eight car-top boat ramps, ten floating campsites, and seven floating toilets located around Lake Oroville. There are major developed recreation facilities at Loafer Creek, Bidwell Canyon, Spillway, and Lime Saddle. Additional recreational and visitor facilities are located at Thermalito Forebay, Thermalito Diversion Pool, Thermalito Afterbay, and the Oroville Wildlife Area (OWA). The locations of recreation facilities at each of these areas are depicted in Figure 1.1-1.

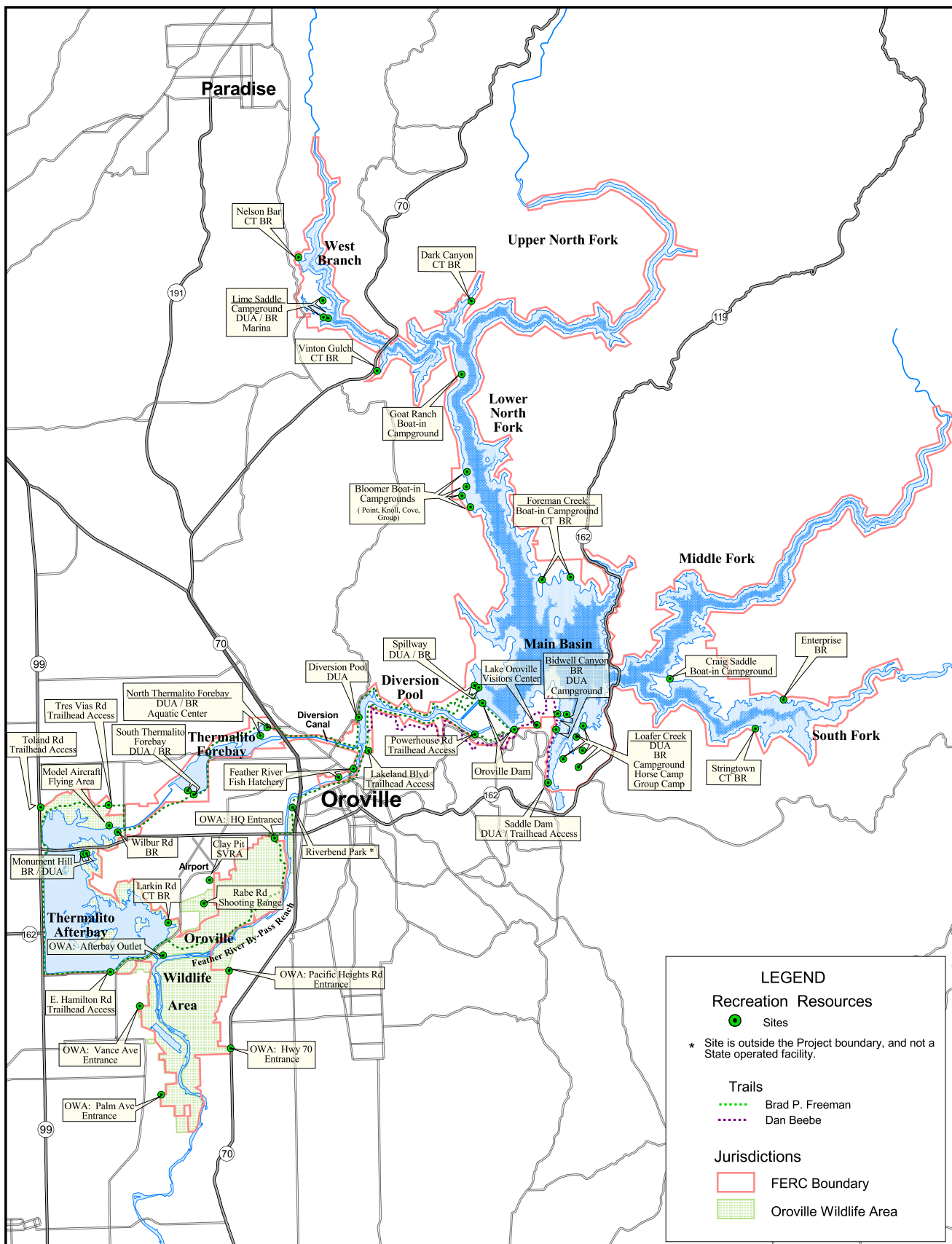
Other recreation opportunities include picnicking, swimming, horseback riding, hiking, off-road bicycle riding, wildlife viewing, and hunting. The area also offers a visitors center and other visitor information sites with cultural and informational displays about Project facilities and the area's natural and cultural environment.

## **1.2 STUDY AREA**

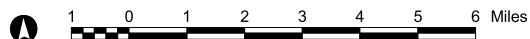
The Oroville Facilities study area for this synthesis report includes all lands and waters within the FERC boundary, and adjacent lands, facilities, and areas with a clear project nexus. This study area extends from south of the city of Oroville to reaches of the South Fork, Middle Fork, and North Fork of the Feather River (see Figure 1.1-1). Within this study area are Lake Oroville, Thermalito Diversion Pool, Low Flow Channel, OWA, and Thermalito Afterbay. Lake Oroville, Thermalito Diversion Pool, and Thermalito Forebay are within the Lake Oroville State Recreation Area (LOSRA), which is managed by California Department of Parks and Recreation (DPR). Project facilities, such as the Oroville Dam, Hyatt Power Plant, Thermalito Diversion Dam and Power Plant, Thermalito Power Canal, and the Thermalito Pumping-Generating Plant, are excluded from this analysis as the public is not generally allowed to visit these types of non-recreation Project facilities.

To place the Oroville Facilities in context, this report also considers the resources of the surrounding area within approximately a ¼ mile of the FERC boundary.

**Insert Figure 1.1-1.**



Source: DWR GIS / EDAW 2004



Scale 1 : 142,560  
1" = 2.25 miles

**LEGEND**

**Recreation Resources**

- Sites
- \* Site is outside the Project boundary, and not a State operated facility.

**Trails**

- Brad P. Freeman
- Dan Beebe

**Jurisdictions**

- FERC Boundary
- Oroville Wildlife Area

STATE OF CALIFORNIA  
DEPARTMENT OF WATER RESOURCES

**Oroville Facilities Relicensing  
FERC Project No. 2100**

Figure 1.1-1  
(R-17)

**Project Area and  
Associated Recreation Sites**



**Insert Figure 1.1-1.**

These surrounding adjacent lands, facilities, and/or areas would need to have a clear Project nexus to be considered.

In some cases, the study area of some of the other 16 recreation studies is different, such as Study R-14 – *Assessment of Regional Recreation and Barriers to Recreation*. In such cases, the different study area is noted for the reader.

### **1.3 DESCRIPTION OF FACILITIES**

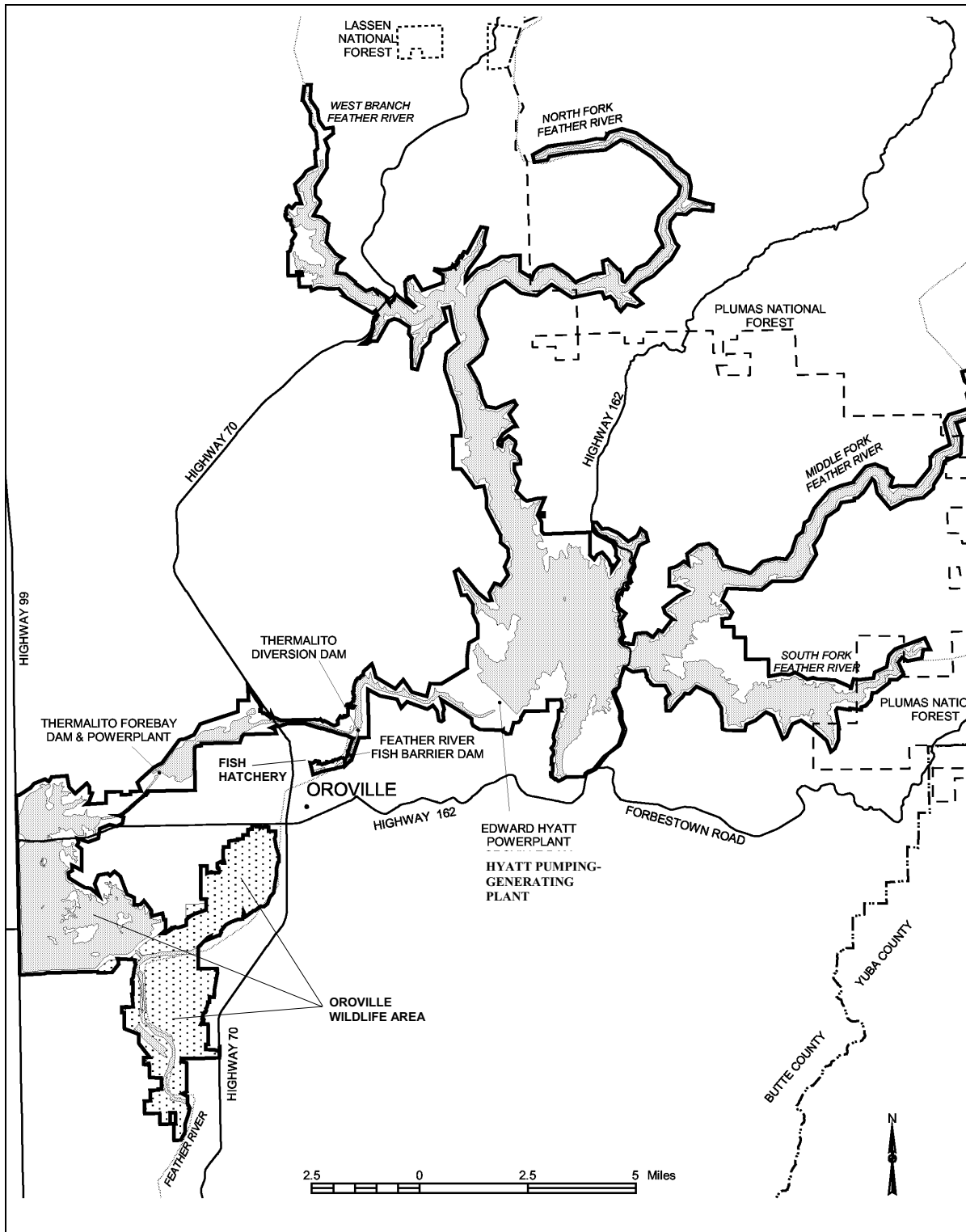
The Oroville Facilities were developed as part of the State Water Project (SWP), a water storage and delivery system of reservoirs, aqueducts, power plants, and pumping plants. The main purpose of the SWP is to store and distribute water to supplement the needs of urban and agricultural water users in Northern California, the San Francisco Bay area, the San Joaquin Valley, and Southern California. The Oroville Facilities are also operated for flood control and power generation, to improve water quality in the Delta, enhance fish and wildlife, and provide recreation.

FERC Project No. 2100 encompasses 41,100 acres and includes Oroville Dam and reservoir, 3 power plants (Hyatt Pumping-Generating Plant, Thermalito Diversion Dam Power Plant, and Thermalito Pumping-Generating Plant), Thermalito Diversion Dam, the Feather River Fish Hatchery and Fish Barrier Dam, Thermalito Power Canal, OWA, Thermalito Forebay and Forebay Dam, Thermalito Afterbay and Afterbay Dam, transmission lines, and a relatively large number of recreational facilities. A geographic overview of these facilities is provided in Figure 1.3-1. Oroville Dam, along with 2 small saddle dams, impounds Lake Oroville, a 3.5-million-acre-foot (maf) capacity storage reservoir with a surface area of 15,810 acres at its maximum normal operating level of 900 feet above mean sea level (msl).

The hydroelectric facilities have a combined licensed generating capacity of approximately 762 megawatts (MW). The Hyatt Pumping-Generating Plant is the largest of the 3 power plants with a capacity of 645 MW. Water from the six-unit underground power plant (three conventional generating and three pumping-generating units) is discharged through two tunnels into the Feather River just downstream of Oroville Dam. The plant has a generating and pumping flow capacity of 16,950 cubic feet per second (cfs) and 5,610 cfs, respectively. Other generation facilities include the 3-MW Thermalito Diversion Dam Power Plant and the 114-MW Thermalito Pumping-Generating Plant.

Thermalito Diversion Dam, 4 miles downstream of the Oroville Dam, creates a tail water pool for the Hyatt Pumping-Generating Plant and is used to divert water into the Thermalito Power Canal. Thermalito Diversion Dam Power Plant is located on the left abutment of the Diversion Dam. The power plant releases a maximum of 615 cfs of water into the river.





**Figure 1.3-1. Oroville Facilities FERC Project 2100 boundary.**

The Thermalito Power Canal is a 10,000-foot-long channel designed to convey generating flows of 16,900 cfs to the Thermalito Forebay and pump-back flows to the Hyatt Pumping-Generating Plant. Thermalito Forebay is an off-stream regulating reservoir for the Thermalito Pumping-Generating Plant. The Thermalito Pumping-Generating Plant is designed to operate in tandem with the Hyatt Pumping-Generating Plant and has generating and pump-back flow capacities of 17,400 cfs and 9,120 cfs, respectively. When in generating mode, the Thermalito Pumping-Generating Plant discharges into Thermalito Afterbay, which is contained by a 42,000-foot-long earthfill dam. The Afterbay is used to release water into the Feather River downstream of the Oroville Facilities, and helps regulate the power system, provides storage for pump-back operations, provides recreational opportunities, and provides local irrigation water. Several local irrigation districts receive Lake Oroville water via the Afterbay.

The Fish Barrier Dam is downstream of the Thermalito Diversion Dam and immediately upstream of the Feather River Fish Hatchery. The flow over the dam maintains fish habitat in the Low Flow Channel of the Feather River between the dam and the Thermalito Afterbay outlet, and provides attraction flow for the hatchery. The hatchery is an anadromous fish hatchery intended to compensate for salmon and steelhead spawning grounds made unreachable by construction of Oroville Dam. Hatchery facilities have a production capacity of 10 million fall-run salmon, 5 million spring-run salmon, and 450,000 steelhead annually (pers. comm., Kastner 2003). However, diseases have occasionally reduced hatchery production in recent years.

The OWA comprises approximately 11,000 acres west of Oroville that is managed for wildlife habitat and recreational activities. It includes Thermalito Afterbay and surrounding lands (approximately 6,000 acres), along with 5,000 acres adjoining the Feather River. The 5,000-acre area is adjacent to or straddles 12 miles of the Feather River, and includes willow- and cottonwood-lined ponds, islands, and channels. Recreation areas include dispersed recreation (hunting, fishing, and bird watching), plus recreation at developed sites, including Monument Hill Day Use Area (DUA), model airplane grounds, and three boat ramps on the afterbay and two on the river, and a primitive camping area. The California Department of Fish and Game's (DFG) habitat enhancement program includes a wood duck nest-box program and dry-land farming for nesting cover and improved wildlife forage. Limited gravel extraction also occurs in a few locations.

#### **1.4 CURRENT OPERATIONAL CONSTRAINTS**

Operation of the Oroville Facilities varies seasonally, weekly, and hourly, depending on hydrology and the objectives that DWR is trying to meet. Typically, releases to the Feather River are managed to conserve water while meeting a variety of water delivery requirements, including flow, temperature, fisheries, diversion, and water quality. Lake Oroville stores winter and spring runoff for

release to the Feather River as necessary for Project purposes. Meeting the water supply objectives of the SWP has always been the primary consideration for determining Oroville Facilities operation (within the regulatory constraints specified for flood control, instream fisheries, and downstream uses). Power production is scheduled within the boundaries specified by the water operations criteria noted above. Annual operations planning is conducted for multiyear carryover storage. The current methodology is to retain half of the Lake Oroville storage above a specific level for subsequent years. Currently, that level has been established at 1.0 maf; however, this does not limit drawdown of the reservoir below that level. If hydrology is drier or requirements greater than expected, additional water could be released from Lake Oroville. The operations plan is updated regularly to reflect forecast changes in hydrology and downstream operations. Typically, Lake Oroville is filled to its maximum operating level of 900 feet above msl in June and then lowered as necessary to meet downstream requirements, to a minimum level in December or January (approximately 700 msl). During drier years, the reservoir may be drawn down more and may not fill to desired levels the following spring. Project operations are directly constrained by downstream operational demands and flood management criteria as described below.

#### **1.4.1 Downstream Operation**

An August 1983 agreement between DWR and DFG entitled *Agreement Concerning the Operation of the Oroville Division of the State Water Project for Management of Fish & Wildlife* (DWR and DFG 1983) sets criteria and objectives for flow and temperatures in the low-flow channel and the reach of the Feather River between Thermalito Afterbay and Verona. This agreement: (1) establishes minimum flows between the Thermalito Afterbay outlet and Verona that vary by water year type; (2) requires flow changes under 2,500 cfs to be reduced by no more than 200 cfs during any 24-hour period (except for flood management, failures, etc.); (3) requires flow stability during the peak of the fall-run Chinook salmon spawning season; and (4) sets an objective of suitable temperature conditions during the fall months for salmon and during the spring/summer for shad and striped bass.

##### ***1.4.1.1 Instream Flow Requirements***

The Oroville Facilities are operated to meet minimum flows in the lower Feather River as established by the 1983 agreement (see above). The agreement specifies that Oroville Facilities release a minimum of 600 cfs into the Feather River from the Thermalito Diversion Dam for fisheries purposes. This is the total volume of flows from the diversion dam outlet, the diversion dam power plant, and the Feather River Fish Hatchery pipeline.

Generally, the instream flow requirements below Thermalito Afterbay are 1,700 cfs from October through March, and 1,000 cfs from April through September.

However, if runoff for the previous April–July period is less than 1,942,000 acre-feet (af) (i.e., the 1911–1960 mean unimpaired runoff near Oroville), the minimum flow can be reduced to 1,200 cfs from October to February, and 1,000 cfs for March. A maximum flow of 2,500 cfs is not exceeded from October 15 through November 30 to prevent spawning in overbank areas that might become dewatered.

#### **1.4.1.2 Temperature Requirements**

The Diversion Pool provides the water supply for the Feather River Fish Hatchery. The hatchery temperature objectives are 52°F for September, 51°F for October and November, 55°F for December through March, 51°F for April through May 15, 55°F for last half of May, 56°F for June 1–15, 60°F for June 16–August 15, and 58°F for August 16–31. In April through November, a temperature range of plus or minus 4°F is allowed for objectives.

There are several temperature objectives for the Feather River downstream of the Thermalito Afterbay outlet. During the fall months, after September 15, the temperatures must be suitable for fall-run Chinook salmon. From May through August, the temperatures must be suitable for shad, striped bass, and other fish.

National Oceanic and Atmospheric Administration Fisheries National Marine Service (NOAA Fisheries) has also established an explicit criterion for steelhead trout and spring-run Chinook salmon, memorialized in a biological opinion on the effects of the Central Valley Project and SWP on Central Valley spring-run Chinook and steelhead. As a reasonable and prudent measure, DWR attempts to control water temperature at Feather River mile 61.6 (Robinson's Riffle in the low-flow channel) from June 1 through September 30. This measure attempts to maintain water temperatures less than or equal to 65°F on a daily average. The requirement is not intended to preclude pump-back operations at the Oroville Facilities needed to assist the State of California with supplying energy during periods when the California Independent System Operator (ISO) anticipates a Stage 2 or higher alert.

The hatchery and river water temperature objectives sometimes conflict with temperatures desired by agricultural diverters. Under existing agreements, DWR provides water for the Feather River Service Area (FRSA) contractors. The contractors claim a need for warmer water during spring and summer for rice germination and growth (i.e., minimum 65°F from approximately April through mid-May, and minimum 59°F during the remainder of the growing season), though there is no explicit obligation for DWR to meet the rice water temperature goals. However, to the extent practical, DWR does use its operational flexibility to accommodate the Feather River Service Area contractors' temperature goals.

#### **1.4.1.3 Water Diversions**

Monthly irrigation diversions of up to 190,000 af (July 2002) are made from the Thermalito Complex during the May–August irrigation season. The total annual entitlement of the Butte and Sutter County agricultural users is approximately 1.0 maf. After these local demands are met, flows into the lower Feather River (and outside of the Project 2100 boundary) continue into the Sacramento River and into the Sacramento-San Joaquin Delta. In the northwestern portion of the Delta, water is pumped into the North Bay Aqueduct. In the south Delta, water is diverted into Clifton Court Forebay where the water is stored until it is pumped into the California Aqueduct.

#### **1.4.1.4 Water Quality**

Flows through the Delta are maintained to meet Bay-Delta water quality standards arising from DWR's water rights permits. These standards are designed to meet several water quality objectives such as salinity, Delta outflow, river flows, and export limits. The purpose of these objectives is to attain the highest reasonable water quality, considering all demands being made on the Bay-Delta waters. In particular, they protect a wide range of fish and wildlife including Chinook salmon, Delta smelt, striped bass, and the habitat of estuarine-dependent species.

#### **1.4.2 Flood Management**

The Oroville Facilities are an integral component of the flood management system for the Sacramento Valley. During the wintertime, the Oroville Facilities are operated under flood control requirements specified by the U.S. Army Corps of Engineers (USACE). Under these requirements, Lake Oroville is operated to maintain up to 750,000 af of storage space to allow for the capture of significant inflows. Flood control releases are based on the release schedule in the flood control diagram or the emergency spillway release diagram prepared by the USACE, whichever requires the greater release. Decisions regarding such releases are made in consultation with the USACE.

The flood control requirements are an example of multiple use of reservoir space. When flood management space is not required to accomplish flood management objectives, the reservoir space can be used for storing water. From October through March, the maximum allowable storage limit (point at which specific flood release would have to be made) varies from about 2.8 maf to 3.2 maf to ensure adequate space in Lake Oroville to handle flood flows. The actual encroachment demarcation is based on a wetness index, computed from accumulated basin precipitation. This allows higher levels in the reservoir when the prevailing hydrology is dry. When the wetness index is high in the basin (i.e., high potential runoff from the watershed above Lake Oroville), required flood management space is at its greatest to provide the necessary flood protection. From April

through June, the maximum allowable storage limit is increased as the flooding potential decreases, which allows capture of the higher spring flows for use later in the year. During September, the maximum allowable storage decreases again to prepare for the next flood season. During flood events, actual storage may encroach into the flood reservation zone to prevent or minimize downstream flooding along the Feather River.

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## **2.0 NEED FOR THIS STUDY**

This study is needed because FERC regulations require that licensees develop a comprehensive recreation plan during the relicensing process. The Recreation Needs Analysis is a critical technical study component preceding the development of a Draft Recreation Management Plan (Oroville Facilities RMP) in 2004. This study identifies and estimates existing and future public recreation needs in the Oroville Facilities study area based on the results of the various other recreation studies conducted during the relicensing process.



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### 3.0 STUDY OBJECTIVES

The objective of this specific study is to synthesize the results of the other various technical recreation and resource studies and to identify overall and site-specific public recreation-related needs in the study area. This study identifies and estimates existing and future public recreation facilities and services that are likely to be needed in the study area during the next license period (30-year minimum).

The objective of this study is to develop a comprehensive list of both overall and site-specific public recreation-related needs in the Oroville Facilities study area. The report identifies and estimates existing and future public recreation facilities and services that are likely to be needed in the study area through the term of the anticipated new license (30 years minimum). These recreation needs are typically water-oriented and within or adjacent to the Project boundary. It is not the intent of this study to identify ways that potential recreation opportunities can increase economic development in the Oroville area or Butte County. As such, this study may differ from other recent planning efforts conducted by various stakeholders during the relicensing process.

Results from this study are intended to synthesize and help address Issue Statements identified by the Recreation and Socioeconomics Work Group (RSWG):

- € Assess the adequacy of existing Project recreation facilities, opportunities, and access to accommodate current use and future demand;
- € Assess the adequacy of public safety at the study area recreational facilities;
- € Assess the effects of facilities operations on recreation and socioeconomic opportunities;
- € Assess the adequacy of operations and maintenance (O&M) and clean-up activities associated with existing and new recreation areas;
- € Identify options for appropriate recreation funding, development, and management structure, and the resulting specific recreation activities; and
- € Identify options for appropriate management of fisheries and wildlife resources to provide recreational opportunities.

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## 4.0 METHODOLOGY

This study synthesizes the major results of the other technical recreation resource studies into a single report that identifies and estimates existing and future public recreation needs in the Oroville Facilities study area throughout the anticipated term of the new license, as required by FERC guidelines. The following FERC relicensing studies were reviewed and used to determine recreation needs in the Oroville Facilities study area:

- € SP-R-1 – *Vehicular Access Study*;
- € SP-R-2 – *Recreation Safety Assessment*;
- € SP-R-3 – *Assess Relationship of Project Operations and Recreation*;
- € SP-R-4 – *Relationship Assessment of Fish/Wildlife Management and Recreation*;
- € SP-R-5 – *Recreation Areas Management Assessment*;
- € SP-R-6 – *ADA Accessibility Assessment*;
- € SP-R-7 – *Reservoir Boating*;
- € SP-R-8 – *Recreation Carrying Capacity*;
- € SP-R-9 – *Existing Recreation Use*;
- € SP-R-10 – *Recreation Facility and Condition Inventory*;
- € SP-R-11 – *Recreation and Public Use Impact Assessment*;
- € SP-R-12 – *Projected Recreation Use*;
- € SP-R-13 – *Recreation Surveys*;
- € SP-R-14 – *Assess Regional Recreation and Barriers to Recreation*;
- € SP-R-15 – *Recreation Suitability Study*;
- € SP-R-16 – *Whitewater and River Boating*;
- € SP-R-18 – *Recreation Activity and Spending/Economic Impacts (selected data)*;
- € SP-R-19 – *Fiscal Impacts (selected data)*;
- € SP-L-1 – *Land Use (selected data)*;
- € SP-L-2 – *Land Management (selected data)*;
- € SP-W-3 – *Recreation Facilities and Operations Effect on Water Quality (selected data)*; and
- € Terrestrial and Cultural Studies (selected data in geographic information system [GIS]-based suitability analysis).

In general, existing public recreation needs were identified and future needs were projected for increments of time (e.g., 10-year periods) over the term of the anticipated new license. Specific components of this analysis included the following two steps:

- € Analysis of overall and programmatic recreational needs in the Oroville Facilities study area; and

- ∄ Identification of recreation needs on a site-by-site basis, both existing and future (in 10-year increments to 2050).

Many different types of sites, facilities, and use areas associated with various recreation activities were considered in this analysis. Facilities and sites related to the following activities were specifically considered:

- ∄ Camping (at developed and dispersed undeveloped shoreline sites);
- ∄ Day use/picnicking (at developed and dispersed undeveloped shoreline sites);
- ∄ Boating (motorized and non-motorized);
- ∄ Swimming and sunbathing;
- ∄ Visiting interpretation and education (I&E) facilities (including programs and signs);
- ∄ Non-motorized trail use (including hiking, walking, mountain biking, and equestrian);
- ∄ Fishing (boat and bank); and
- ∄ General use of open space (including hunting, wildlife observation and photography, birding, and other similar activities).

#### **4.1 IDENTIFY OVERALL RECREATION NEEDS**

Overall recreation needs in the study area were identified based on the major results of other technical recreation resource studies conducted for relicensing. This information was synthesized and presented by recreation activity type.

For each activity type, various analysis factors were considered including:

- ∄ Recreation Supply
- ∄ Recreation Demand
- ∄ Recreation Capacity
- ∄ Recreation Suitability
- ∄ Recreation Operations and Maintenance (O&M)

Overall recreation needs in the study area were assessed using an analysis that compares and contrasts demand, supply, and capacity factors to arrive at results regarding overall recreation needs. This first step focused on the overall need for various types of facilities, for example, without specifying where that need may be met. This included consideration of both developed and dispersed undeveloped recreation sites or use areas.

With respect to existing facility utilization, capacity thresholds for selected activities were used to assess peak season recreation use. Existing or projected utilization over these identified thresholds represents demand that may be in excess of capacity for planning purposes. This was one method used to determine the approximate number of facilities (campsites and parking spaces,

for example) that would likely be needed in the short and long term to meet existing and projected demand. It should be noted that all facilities related to projected demand may not ultimately be constructed because of sensitive resource or other constraints, as well as detailed engineering feasibility study results and environmental permitting. It may be determined later that some potential facilities do not provide sufficient benefit to warrant construction and follow-on annual O&M expenditures based on future engineering cost-benefit analyses.

A number of other interrelated factors were also considered in this overall needs determination. Factors considered include recreation facility condition, occupancy, visitor preferences, agency consultation, and capacity considerations, among other factors. Types of data for these factors included:

- ∄ Recreation user survey responses;
- ∄ Visitor perceptions of crowding;
- ∄ Projected increases in demand for various activities;
- ∄ Seasonal and weekday/weekend occupancy rates;
- ∄ Facility and use area capacity utilization;
- ∄ Physical and spatial arrangement of existing facilities and use areas;
- ∄ Existing facility conditions and ADA-related accessibility guidelines;
- ∄ Potential ecological impacts of recreation activities;
- ∄ Opportunities and constraints analyses depicting potential sites or areas;
- ∄ Opportunities for infill, redesign, or expansion of existing facilities;
- ∄ Management goals and objectives of published plans;
- ∄ Visual observations and observed impacts from existing use;
- ∄ Cross-resource impacts;
- ∄ Project operational constraints and effects;
- ∄ Professional judgment;
- ∄ Published recreation studies and data; and
- ∄ Stakeholder input.

Considering the vast size and numerous features of the study area, in the overall analysis (Chapter 5.0) and the site-by-site analysis (Chapter 6.0), information is often presented by “resource areas,” which will include:

- ∄ Lake Oroville
- ∄ Diversion Pool
- ∄ Low Flow Channel
- ∄ Thermalito Forebay
- ∄ OWA
- ∄ Thermalito Afterbay

As a part of this analysis, regional recreation resources are summarized to provide a brief context as to the relative amount of outdoor recreation resources available in the vicinity of the Oroville Facilities.

#### **4.2 IDENTIFYING RECREATION NEEDS ON A SITE-BY-SITE BASIS**

Site-specific needs were additionally identified through a review and analysis of several other data types, including:

- ∄ Recreation survey responses about specific sites;
- ∄ Seasonal and weekday/weekend occupancy rates at specific sites;
- ∄ Spatial arrangement of sites and design problems observed;
- ∄ Facility conditions;
- ∄ ADA-related accessibility compliance and guidelines;
- ∄ Opportunities for infill, redesign, or expansion at each site;
- ∄ Observed impacts of use at each site;
- ∄ Project operations and maintenance;
- ∄ Cross-resource impacts;
- ∄ Professional judgment; and
- ∄ Stakeholder input.

The estimate of future recreation needs started with and built upon the list of identified existing recreation resource needs. This analysis projected overall recreation needs in 10-year increments to 2050. Where new recreation facilities might be considered in a given area to help satisfy demand, the anticipated implementation phase was projected. Primary indicators used in defining future needs for developed facilities are projected increases in demand over 30 to 50 years and anticipated facility utilization. Projected future recreation needs were estimated for each developed facility and for selected activities. Specific cultural, environmental, and/or capacity constraints that may limit the suitability of future recreation development at specific sites were also considered.

The conclusions of this assessment are identified existing recreation needs and potential future recreation needs in the study area, categorized by resource area (such as Lake Oroville, Diversion Pool, etc.) and by recreation site. Both capital improvements (one time expenses) and ongoing annual O&M needs are identified. Non-motorized trails are discussed both in terms of site-specific needs and overall needs within the study area. In addition, programmatic needs are outlined.

## 5.0 STUDY RESULTS

This section provides an analysis of overall “big picture” needs for various types of recreation activities within the Oroville Facilities study area. These overall recreation needs were determined based on results from the technical recreation relicensing studies. The assessment considered both developed and dispersed recreation sites and use areas, as well as popular activities in each resource area. First, regional recreation resources are briefly summarized; then, identified and estimated existing and future recreation resource needs within the Oroville Facilities study area are discussed. Specific recreation activities and needs considered in this analysis include:

- ∄ Camping needs
- ∄ Day use/picnicking needs
- ∄ Boating needs
- ∄ Swimming and sunbathing needs
- ∄ Interpretation and education (I&E) needs
- ∄ Trail use needs
- ∄ Fishing needs
- ∄ Open space-related activity needs
- ∄ Programmatic needs

Following Chapter 5.0, Chapter 6.0 presents the conclusions of this study by identifying how overall “big picture” needs defined in Chapter 5.0 are allocated on a site-by-site basis within the Oroville Facilities study area, as well as some programmatic needs.

### 5.1 SUMMARY OF REGIONAL WATER-BASED RECREATION NEAR THE PROJECT

Understanding recreation supply and demand within the regional context is important when considering existing and future recreation resource needs within the study area and within the FERC boundary. Recreational supply and demand information for the study area and for the surrounding Northern California region (extending from Trinity Lake and Shasta Lake in the north to Lake Berryessa and Folsom Lake in the south) has been gathered from various sources including existing reports and recreation participant surveys. Further information can be found in Study R-14 – *Assessment of Regional Recreation and Barriers to Recreation*.

#### **5.1.1 Regional Water Bodies Used for Recreation**

Lake Oroville is one of 37 Northern California lakes, reservoirs, and rivers that offer similar recreational opportunities within the Study R-14 regional study area. Of these 37 recreation locations, the following 22 lakes and reservoirs and their



surrounding lands were compared to the Oroville Facilities and provide the most similar lake and reservoir-based recreational opportunities:

- |                              |  |
|------------------------------|--|
| ☐ Black Butte Lake           | ☐ Lake Berryessa   |
| ☐ Bucks Lake Recreation Area | ☐ Lake Pillsbury   |
| ☐ Bullard's Bar Reservoir    | ☐ Lake Tahoe   |
| ☐ Butt Valley Reservoir      | ☐ Shasta Lake  |
| ☐ Clear Lake                 | ☐ Lake Spaulding   |
| ☐ East Park Reservoir        | ☐ Little Grass Valley Reservoir                                  |
| ☐ Englebright Lake           | ☐ Stony Gorge Reservoir  |
| ☐ Folsom Reservoir           | ☐ Trinity Lake   |
| ☐ Indian Valley Reservoir    | ☐ Upper Feather River Reservoirs<br>(Antelope, Frenchman, Davis) |
| ☐ Lake Almanor               | ☐ Whiskeytown Lake   |

Similarities and differences between the Oroville Facilities and these 22 regional lakes and reservoirs are briefly summarized below.

#### **5.1.1.1 Size of Regional Lakes and Reservoirs**

Lake Oroville is neither the largest nor the smallest water body in the region. Of the 20 analyzed water bodies, four were notably larger than Lake Oroville (15,810 acres) in surface area, including: Lake Tahoe at 122,200 acres; Clear Lake at 40,000 acres; Shasta Lake at 29,500 acres; and Lake Almanor at 27,064 acres. Three lakes were within the same general size range as Lake Oroville, including: Lake Berryessa at 21,000 acres; Trinity Lake at 16,535 acres; and Folsom Reservoir at 12,000 acres. The remaining 15 locations offer reservoir surface areas of less than 5,000 acres, substantially smaller than Lake Oroville (see Study R-14 – *Assessment of Regional Recreation and Barriers to Recreation*).

#### **5.1.1.2 Locations of Regional Lakes and Reservoirs**

Recreation participants are likely to make use of the nearest recreation areas that can suitably meet their needs (Figure 5.1-1). As such, it is important to consider the distances between Oroville Facilities and other available water bodies in order to determine the likelihood that the recreational needs of Lake Oroville visitors might be met at the other water bodies. Table 5.1-1 lists the approximate distances between Lake Oroville and the other analyzed water bodies. Distances vary greatly, ranging from 40 miles to 160 miles from the Lake Oroville area.